

A car accelerates from rest to 25 m/s in 7 seconds. What is the car's acceleration?

$$\begin{aligned}\bar{a} &= \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i} & \bar{a} &= ? \\ \bar{v}_i &= 0 \text{ m/s} \\ \bar{v}_f &= 25 \text{ m/s} \\ t_i &= 0 \text{ s} \\ t_f &= 7 \text{ s} \\ \bar{a} &= \frac{\bar{v}_f}{t_f} \\ &= \frac{25 \text{ m/s}}{7 \text{ s}} \\ &= 3.57 \text{ m/s}^2\end{aligned}$$

A car is traveling at 38 m/s and slows down with an acceleration of -1.54 m/s/s. How much time did the car take to come to rest?

$$\begin{aligned}\bar{a} &= \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i} & \bar{a} &= -1.54 \text{ m/s}^2 \\ \bar{v}_i &= 38 \text{ m/s} \\ \bar{v}_f &= 0 \text{ m/s} \\ t_i &= 0 \text{ s} \\ t_f &= ? \\ \bar{a} &= \frac{-\bar{v}_i}{t_f} \\ t_f &= \frac{-\bar{v}_i}{\bar{a}} \\ &= \frac{-38 \text{ m/s}}{-1.54 \text{ m/s/s}} \\ &= 24.68 \text{ s}\end{aligned}$$